

PRELIMINARY REVISION OF THE BOMBYCES OF AMERICA NORTH OF MEXICO.

By B. NEUMEGEN AND HARRISON G. DYAR.

(CONTINUED FROM PAGE 132.)

Family CERATOCAMPIDÆ.

*Synopsis of genera.*

- Vein II, arising from a stalk with veins 6 & 8.  
 Exterior margin of primaries nearly straight, longer than internal margin . . . . . **Anisota.**  
 Exterior margin convex, shorter than interior margin . . . . . **Sphingicampa.**  
 Vein II from the sub-costal, before apex of discal cell; size very large  
 Wings elongate, rather narrow; abdomen exceeding secondaries, **Citheronia.**  
 Wings broader, apices rectangular; abdomen scarcely exceeding secondaries . . . . . **Basilona.**

Genus **Anisota** *Hübner.*

- 1822?—*Anisota* HÜBNER, Verz. bek. Schmettl., p. 193.  
 1841—*Dryocampa* HARRIS, Rep. Ins. Mass., p. 289.

*Synopsis of species.*

- Colors various shades of brown; a discal dot.  
 ♂ similar to ♀, wings opaque . . . . . **stigma.**  
 ♂ dissimilar, wings translucent centrally.  
 Primaries of ♂ translucent centrally, ♀ with black dots . . . **senatoria.**  
 Primaries ♂ hyaline centrally, ♀ without black dots . . . **virginiensis.**  
 Colors pink and yellow or white; no discal dot . . . . . **rubicunda.**

**A. stigma** *Fabricius.*

1775—*Bombyx stigma* FABRICIUS, Syst. Ent., p. 563.

♂ ♀ Bright ochereous brown, with many black strigose dots, especially on primaries. T. a. and t. p. bands purplish, the former faint. A white discal dot. On secondaries, a median purplish band. The ♂ is a little smaller and darker than the ♀, but closely similar to it. Expanse, 40—50 mm.

*Habitat*, Atlantic States westward.

**A. senatoria** *Abbot & Smith.*

1797—*Phalena senatoria* ABBOT & SMITH, Lep. Ins. Ga., pl. 57.

♂ Ochereous brown, primaries purplish at base and apex, nearly hyaline centrally. Secondaries produced at anal angle almost

square. Lines obsolete, but white discal spot very distinct. Expanse, 30—37 mm.

♀ Very dissimilar to ♂. It is exactly like the ♀ of *stigma*, but usually slightly less dotted with blackish. Expanse, 53—55 mm.

*Habitat*, Atlantic States westward.

#### A. *virginiensis* Drury.

1773—*Bombyx virginensis* DRURY, Ill. Exot. Ent., Vol. II, pl. 13, f. 2.

1789—*Bombyx astynone* OLIVER, Encycl. Meth., Vol. V, p. 43.

1797—*Phalena pellucida* ABBOT & SMITH, Lep. Ins. Ga., pl. 58.

♂ Like *senatoria*, but darker colored, and center of primaries hyaline. ♀ Purplish brown, especially purplish in marginal space. Wings sub-translucent, lines faint, discal dot distinct. No dots on the wings.

*Habitat*, Atlantic States westward.

#### A. *rubicunda* Fabricius.

1793—*Bombyx rubicunda* FABRICIUS, Ent. Syst., Vol. III (1), p. 429.

##### race *alba* Grote.

1874—*Dryocampa rubicunda* var. *alba* GROTE, Bull. Buff. Soc., Vol. II, p. 183.

1875—*Dryocampa pallida* BOWLES, Can. Ent., Vol. VII, p. 108.

Light yellow. Basal and marginal spaces on primaries, and a diffused and faint sub-marginal line on secondaries rose pink. Expanse, ♂ 40—45 mm., ♀ 50—55 mm.

*Habitat*, Atlantic States.

The race *alba* is entirely creamy white above.

*Habitat*, Mississippi Valley to Canada.

#### Genus *Sphingicampa* Walsh.

1864—WALSH, Proc. Bost. Soc. Nat. Hist., Vol. IX, p. 290.

##### *Synopsis of species.*

Secondaries without discal dot.

Primaries usually heavily irrorate, t. p. line diffuse.

T. a. line faint or absent, discal dots usually present . . . . . **bicolor.**

T. a. line as distinct as t. p. line; no discal dots . . . . . **quadrilineata.**

Primaries slightly irrorate; t. p. line distinct, straight, . . . . . **bisecta.**

Secondaries with large round black discal dot.

A dark obscure transverse line on primaries . . . . . **heiligbrodti.**

Transverse lines of primaries white . . . . . **albineata.**

#### S. *bicolor* Harris.

1841—*Dryocampa bicolor* HARRIS, Rep. Ins. Mass., p. 203.

1864—*Sphingicampa distigma* WALSH, Proc. Bost. Soc. Nat. Hist., Vol. IX, p. 290.

*var. suprema* Neumagen.1885—*Sphingicampa bicolor* var. *suprema* NEUMEGEN, Ent. Amer., Vol. I, p. 94.*var. immaculata* Jewett.1882—*Adelocephala bicolor* var. *immaculata* JEWETT, Pap., Vol. II, p. 144.

Primaries ochereous brown, shading into dark flesh pink along external and internal margins, nearly covered with strigose slate gray dots. Two white discal dots and a diffuse slate gray t. p. band. The rest of the body and hind wings dark pink except base of secondaries and a median band, which are carmine red. Expanse, 45--50 mm.

The *var. suprema* is entirely sordid cinereous instead of pinkish, secondaries carmine except the outer border.

The *var. immaculata* lacks the dots on the wings.

*Habitat*, Mississippi Valley.

**S. quadrilineata** Grote & Robinson.1867—*Adelocephala quadrilineata* GROTE & ROBINSON, Trans. Am. Ent. Soc., Vol. I, p. 11.

Closely resembling *bicolor* but the primaries less covered with strigæ and those that are present more clouded. T. a. and t. p. lines smoky blackish, equally distinct. A faint discal cloud without white dots. Secondaries rose color from base to near margin, but yellowish at the edge. ♀ Antennæ simple. Expanse, 70 mm.

*Habitat*, Mexico.

**S. bisecta** Lintner.1879—*Anisota bisecta* LINTNER, Can. Ent., Vol. XI, p. 10.*var. nebulosa* Neumagen.1890—*Sphingicampa bisecta* var. *nebulosa* NEUMEGEN, Ent. Amer., Vol. VI, p. 63.

Ochereous brown. On primaries, a t. a. angulate and t. p. straight oblique well defined purplish black lines, the wing faintly covered with purplish strigæ, or almost without them. A faint discal cloud. Secondaries more or less covered by carmine hairs. In the *var. nebulosa*, the whole fore wing is thickly covered by diffuse smoky black strigæ. Expanse, 65—70 mm.

*Habitat*, Texas.

**S. heiligbrodti** Harvey.1877—*Anisota heiligbrodti* HARVEY, Can. Ent., Vol. IX, p. 110.

Primaries iron gray, white and black scales mixed. T. a. line faint. T. p. line crenate. Two white discal dots, the upper fainter or absent. Secondaries and abdomen red, slightly shaded with gray. A large round black discal spot. Outer mesial band faint. Edge of wing iron gray. Antennæ testaceous. Expanse, 65 mm.

*Habitat*, Arizona.

**S. albolineata** *Grote & Robinson.*

1866—*Adeloccephala albolineata* GROTE & ROBINSON, Proc. Ent. Soc. Phil., Vol. VI, p. 7.

1872—*Adeloccephala raspa* BOISDUVAL, Ann. Soc. Ent. Belg., Vol. XV, p. 93.

Thorax and abdomen above, and primaries bright yellow, the latter finely mixed with dark scales. T. a. and t. p. lines white, t. a. line bent in to base of wing, not reaching the internal margin; t. p. line very oblique. A white discal spot. Secondaries deep pink; a black discal spot and white sub-marginal stripe. Costal and external margin dull whitish. Expanse, 65 mm.

*Habitat*, Mexico.

Genus **Citheronia** *Hübner.*

1822?—*Citheronia* HÜBNER, Verz. bek. Schmett., p. 153.

1822?—*Eacles* HÜBNER, Verz. bek. Schmett., p. 153.

1834—*Ceratocampa* HARRIS, Cat. Ins. Mass., p. 591.

1841—*Dorycampa* DUNCAN, Nat. Lib. Ex. Moths, p. 158.

*Synopsis of species.*

Large, veins lined with red or yellow.

Body and markings on wings partly yellow, partly red . . . . .	<b>regalis.</b>
Body and markings entirely red . . . . .	var. <b>infernalis.</b>
Body and markings entirely yellow . . . . .	var. <b>sængeri.</b>
Smaller, dark smoky brown . . . . .	<b>sepulchralis.</b>

**C. regalis** *Fabricius.*

1793—*Bombyx regalis* FABRICIUS, Ent. Syst., Vol. III (1), p. 436.

1797—*Phalena regia* ABBOT & SMITH, Lep. Ins. Ga., Vol. II, pl. 61.

var. **infernalis** *Strecker.*

1884—*Citheronia infernalis* STRECKER, Pap. Vol. IV, p. 73.

var. **sængeri** *Neumögen.*

1891—*C. regalis* var. *sængeri* NEUMÖGEN, Ent. News, Vol. II, p. 151.

Bright red above; a double line on collar; two divergent bands on thorax and anterior edges of abdominal segments, light yellow.

Primaries slate gray, the veins broadly lined with red. A basal, discal and outer row of ovate yellow spots. The outer row consists of about seven intervenular spots of varying size, the costal ones largest; sometimes traces of a median lunulate, diffuse, yellow band. Secondaries largely red, yellow at base and centrally along costa, the gray color appearing faintly between the veins toward outer margin. Expanse, 115—145 mm.

*Habitat*, Atlantic States.

### **C. sepulchralis** Grote & Robinson.

1865—*Citheronia sepulchralis* GROTE & ROBINSON, Proc. Ent. Soc. Phil., Vol. IV, p. 222.

Even, dark, smoky, purplish brown; basal half of secondaries pinkish. On both wings obscure discal spots and outer waved, darker, smoky band. Antennæ testaceous. Expanse, 75—80 mm.

*Habitat*, Southern States.

### Genus **Basilona** Boisduval.

1868—*Basilona* BOISDUVAL, Ann. Ent. Soc. Fr. (4), Vol. VIII, p. 317.

#### *Synopsis of races.*

Ground color yellow.

Wing sparsely covered with blackish brown strigose dots . . . **imperialis**.

Wing heavily covered with such dots . . . , var. **punctatissima**.

Ground color deep russet . . . . . race **nobilis**.

### **B. imperialis** Drury.

1773—*Attacus imperialis* DRURY, Ill. Ex. Ent., Vol. I, pl. 9, ff. 1, 2.

1797—*Phalena imperatoria* ABBOT & SMITH, Lep. Ins. Ga., Vol. II, pl. 55.

1805—*Bombyx didyma* BEAUVOIS, Ins. Afr. Amér., p. 52, pl. 20.

#### var. **punctatissima** Neumagen.

1891—*Eacles imperialis* var. *punctatissima* NEUMEGEN, Ent. News, Vol. II, p. 150.

#### race **nobilis** Neumagen.

1891—*E. imperialis* var. *nobilis* NEUMEGEN, Ent. News, Vol. II, p. 150.

Light yellow with the following marks in brownish purple. Diffuse strigæ on primaries, and outer part of secondaries; tibiæ, patagia, center of thorax, two lateral posterior patches on the thorax and a dorsal band on abdomen, absent on the edges of the segments and containing a row of yellow dorsal spots. On primaries a broad undulate t. a. line, two discal spots and outer transverse line running to apex. In the ♂ the t. a. line is further

from the base than in the ♀, and the basal space and part of the marginal space is shaded with purple. On secondaries, the same markings, but less distinct, and only one discal spot. Éxpance, 115—135 mm.

*Habitat*, Atlantic States westward; of *race nobilis*, Texas.

### Family LASIOCAMPIDÆ.

#### *Synopsis of sub-families and genera.*

- Vein 2 of primaries arising remote from base of wing . . . [see Drepanidæ].  
 Vein 2 of primaries arising near base of wing.  
     Vein 8 of secondaries outwardly united to sub-costal vein by a  
     cross vein, forming a large cell . . . **Gastropachinæ.**  
     Fore wings with a notch at internal angle . . . **Phylloidesma.**  
     Fore wings entire . . . **Heteropacha.**  
 Vein 8 of secondaries free outwardly; intercostal cell small, **Lasiocampinæ.**  
 Vein 7 of secondaries arising from sub-costal toward apex of cell.  
     Vein 8 of primaries arising before apex of cell, free or  
     on a stalk with 9 and 10 . . . **Clisiocampa.**  
     Vein 8 arising beyond end of cell, on a stalk with 6 and 7.  
     Thorax hairy, normal.  
     Antennæ long and slender . . . **Hypopacha.**  
     Antennæ shorter, the pectinations decreasing in  
     length toward the tip . . . **Artace.**  
     Thorax with a patch of curled, scale-like hairs . . . **Tolype.**  
 Vein 7 of secondaries arising with vein 8 from intercostal cell.  
     Vein 8 of primaries arising before apex of cell, free or  
     on stalk with vein 7 . . . **Dendrolimus.**  
     Vein 8 arising beyond end of cell, on a stalk with 6  
     and 7 . . . **Edwardsimemna.\***

#### Sub-family GASTROPACHINÆ.

#### Genus *Phylloidesma* Hübner.

1822? - *Phylloidesma* HÜBNER, Verz. bek. Schmett., p. 190.

1866—*Epicnaptera* RAMBUR, Cat. Lep. And., p. 344.

1869—*Ammatocampa* WALLENGREN, Skand. Het., Vol. II, p. 113.

\* *Edwardsimemna* gen. n. (type *Gloveria jalapæ* Hy. Edw.) Fore wings a in *Dendrolimus* except that veins 6 to 8 are on a long stalk; stalk of 9 and 10 equally long; hind wings vein 6 from apex of cell, veins 7 and 8 together from the end of the short, rounded intercostal cell; humeral veins feeble. ♀ antennæ serrate. Palpi surpassing the front, projecting, dependent, hairy. Wings rounded-outer margin crenulate.

*Synopsis of species.*

Color rusty brown or gray.

Primaries with white shades . . . . . **americana.**

Wings largely or wholly gray . . . . . *race* **californica.**

Wings brown, without white shades.

Sexes concolorous or nearly so . . . . . *var.* **ferruginea.**

♀ more luteous than ♂ . . . . . *race* **roseata.**

Color contrasting yellow and brown . . . . . **dyari.**

**P. americana** *Harris.*

1841—*Gastropacha americana* HARRIS, Rep. Ins. Mass., p. 273.

1855—*Gastropacha occidentis* WALKER, Cat. Brit. Mus., Vol. VI, p. 1392.

1868—*Lasiocampa carpinifolia* BOISDUVAL, Ann. Ent. Soc. Belg., Vol. XII,  
p. 83.

*var. ferruginea* *Packard.*

1864—*Gastropacha ferruginea* PACKARD, Proc. Ent. Soc. Phil., Vol. III, p. 386.

*race roseata* *Stretch.*

1872—*Gastropacha roseata* STRETCH, Zyg. & Bomb. N. A., pl. 4, f. 12.

1872—*Gastropacha mildei* STRETCH, Zyg. & Bomb. N. A., p. 113.

*race californica* *Packard.*

1872—*Gastropacha californica* PACKARD, Rep. Peab. Acad., Vol. IV, p. 91.

Ferruginous brown, frosted with white scales. T. a. and t. p. lines slender, lunulate, blackish. A slight discal dot. S. t. line reddish, bordered by a white shade. A mesial line and discal dot on secondaries followed by a white shade and obscure sub-marginal band. The race *californica* is gray, more or less tinged with brown. Expanse, 27—35 mm.

*Habitat*, Atlantic States to Canada and Pacific Northwest; of race *californica*, Rocky Mountains to Southern California; of race *roseata*, California.

**P. dyari** *Rivers.*

1893—*Phyllodesma dyari* RIVERS, Can. Ent., Vol. XXV, p. 144.

♂ Pale yellowish ocher; outer part of fore wings rosy brown, the color extending to the middle one of three lines of dusky spots which cross the disc. A pale mesial band on hind wings. ♀ Paler than the ♂ with distinct emarginations between the terminations of the venules. Expanse, 38—55 mm.

*Habitat*, Western Texas, Mexico (?).

Genus **Heteropacha** *Harvey.*

1874—*Heteropacha* HARVEY, Bull. Buff. Soc., Vol. I, p. 262.

**H. rileyana** Harvey.1874—*Heteropacha rileyana* HARVEY, Bull. Buff. Soc., Vol. I, p. 262.

Gray; median space blackish, secondaries brownish. T. a. and t. p. lines obscure, whitish, sub-dentate, defined by blackish scales. A sub-terminal row of venular dots; fringe black spotted. Expanse, 27—32 mm.

*Habitat*, Mississippi Valley.

[The description by Harvey of the venation of secondaries is erroneous.]



Sub-family LASIOCAMPINÆ.

Genus **Clisiocampa** Curtis.1828—*Clisiocampa* CURTIS, Brit. Ent., Vol. V, pl. 229.*Synopsis of species.*

Sexes concolorous or nearly so; wings crossed by a pair of darker lines, rarely obsolete, not dentate, or by a broad brown band,

**disstria** *rare erosa.*

Sexes concolorous or not; the wings crossed by paler lines except when the ground color is pale.

Sexes alike; wings chocolate brown with straight white bands, **americana.**

Sexes alike or the ♂ pale; wings gray or chocolate brown, rarely luteous; bands often denticulate . . . . . **fragilis.**

Sexes discolorous, the ♀ normally paler than the ♂, but ♂ sometimes also pale; lines dark in the pale forms, more or less denticulate . . . . . **pluvialis, californica, ambisimilis.**

Sexes discolorous; ♂ very pale, ♀ dark, but both with darker lines on fore wings . . . . . **constricta.**

**C. disstria** Hübner.1822?—*Malacosoma disstria* HÜBNER, Verz. bek. Schmett., p. 122.1868—*Bombyx drupacearum* BOISDUVAL, Ann. Ent. Soc. Belg., Vol. XII, p. 82.*var. sylvatica* Harris.1841—*Clisiocampa sylvatica* HARRIS, Rep. Ins. Mass., p. 271.*var. thoracicoides* Neumagen & Dyar.1893—*Clisiocampa disstria* var. *thoracicoides* NEUMAGEN & DYAR, Journ. N. Y. Ent. Soc., Vol. I, p. 30.

Light yellowish brown, the ♀ paler; fore wings crossed by two dark brown bands. In the *var. sylvatica*, the space between these bands is uniformly filled in with brown, and in the *var. thoracicoides*, the bands are very obscure. A form with irrorate wings and dark secondaries occurs in Texas. Expanse, 18—40 mm.

*Habitat*, Atlantic States to Mississippi Valley.



*race erosa* Stretch.1881—*Clisiocampa erosa* STRETCH, Pap., Vol. I, p. 64.*var. sylvaticoides* Neumägen & Dyar.1893—*Clisiocampa erosa* var. *sylvaticoides* NEUMEGEN & DYAR, Journ. N. Y. Ent. Soc., Vol. I, p. 30.*var. thoracica* Stretch.1881—*Clisiocampa thoracica* STRETCH, Pap., Vol. I, p. 68.*var. perversa* Neumägen & Dyar.1893—*Clisiocampa erosa* var. *perversa* NEUMEGEN & DYAR, Journ. N. Y. Ent. Soc., Vol. I, p. 30.

Race *erosa*: yellowish brown, the ♀ exactly like ♀ *disstris*, the ♂ usually darker than ♂ *disstris*. In the *var. sylvaticoides*, the space between the lines is partially filled in with dark brown; the *var. thoracica* has the lines obscure, and the *var. perversa* has basal and marginal spaces shaded with brown. Expanse, 19—35 mm.

*Habitat*, California and Pacific northwest.

**C. americana** Fabricius.1793—*Bombyx americana* FABRICIUS, Ent. Syst., Vol. III, p. 4331855—*Clisiocampa decipiens* WALKER, Cat. Brit. Mus., pt. VI, p. 1483.1868—*Bombyx frutetorum* BOISDUVAL, Ann. Ent. Soc. Belg., Vol. XII, p. 82.

♂ ♀ Walnut brown (Ridgway, III, 7), the thorax often grayish. Two parallel oblique white lines on primaries, either approximate or remote, the space between them often heavily dusted with white. In some males, the ground color is irregularly defined beyond the outer line. Secondaries immaculate. Fringe of both wings irregularly white spotted.

*Habitat*, Atlantic States westward; Canada to Florida and Texas.

**C. fragilis** Stretch.1881—*C. fragilis* STRETCH, Papilio, Vol. I, p. 64.1882—*C. incurva* HY. EDWARDS, Papilio, Vol. II, p. 125.1893—*C. mus* var. *discolorata* NEUMEGEN, Can. Ent., Vol. XXV, p. 4.*var. mus* Neumägen.1893—*C. mus* NEUMEGEN, Can. Ent., Vol. XXV, p. 4.*var. constrictina* Neumägen & Dyar.1893—*C. incurva* var. *constrictina* NEUMEGEN & DYAR, Journ. N. Y. Ent. Soc., Vol. I, p. 30.1893—*C. fragilis* var. *lutescens* NEUMEGEN & DYAR, Journ. N. Y. Ent. Soc., Vol. I, p. 31.

*var. perlutea* Neumögen & Dyar.

1893—*C. fragilis* var. *perlutea* NEUMÖGEN & DYAR, Journ. N.Y. Ent. Soc., Vol. I, p. 31.

Soft chocolate brown to walnut brown, gray brown or blackish, the lines pale, often markedly denticulate. In the ♂ the pale luteous color of the lines may spread and predominate (*var. constrictina*) or cover the whole wing (*var. perlutea*). A very variable species.

*Habitat*, Rocky Mountains from their eastern slope to the Sierras; Canada to Mexico. The peculiar gray form (*var. mus*) occurs in Utah.

**C. pluvialis** Dyar.\*

1893—*Clisiocampa pluvialis* DYAR, Can. Ent., Vol. XXV, p. 42.

Greatly resembling *californica*. The ♂ tends to be darker in color than either *californica* or *fragilis*, though the character is not of diagnostic value. No luteous males have been observed; otherwise the description of *californica* will apply. Separated on larval characters.

*Habitat*, the Pacific northwest.

**C. californica** Packard.\*

1864—*Clisiocampa californica* PACKARD, Proc. Ent. Soc. Phil., Vol. III, p. 387.

1868—*Bombyx pseudoneustria* BOISDUVAL, Ann. Ent. Soc. Belg., Vol. XII, p. 82.

♂ Dark chocolate brown with a faint pale band on secondaries. Lines on fore wings luteous yellow, gently curved, sharply limited towards center of wing, but spreading toward base and outer margin, the outer line sub-crenulate. This pale color may spread till the whole wing is luteous yellow, crossed by two brown lines.

♀ Paler than the male, the ground color consequently normally luteous yellow, dusted with brown and crossed by two brown lines, the outer crenulate. The brown scales may predominate, giving a form somewhat closely resembling the male. Secondaries pale or dark. Expanse, 25—35 mm.

*Habitat*, Coast region of California

**C. ambisimilis** Dyar.\*

1893—*Clisiocampa ambisimilis* DYAR, Can. Ent., Vol. XXV, p. 40.

\* Lava: A dorsal pale line, sometimes obsolete.

Lateral region heavily blue shaded . . . . .	<b>ambisimilis.</b>
Lateral region with no blue shade . . . . .	<b>californica.</b>
A dorsal row of elliptical blue spots . . . . .	<b>pluvialis.</b>

Like *californica* in markings, so far as observed. Separated on larval characters.

*Habitat*, Coast region of California.

**C. constricta** *Stretch*.

1881—*Clisiocampa constricta* STRETCH, Papilio, Vol. I, p. 65.

1881 - *Clisiocampa strigosa* STRETCH, Papilio, Vol. I, p. 67.

1865—*Clisiocampa* || *californica* WALKER, Cat. Brit. Mus., Vol. XXXII, p. 572.

♂ Creamy buff with two brown lines on primaries. ♀ Walnut brown mixed with whitish, with two dark brown lines on primaries, the space between them rather darker than the rest of the wing. Both sexes very uniform and strongly contrasting. Expanse, 25—35 mm.

*Habitat*, Hilly and Mountainous parts of California.

Genus **Hypopacha** *Neumegen & Dyar*.

1893—*Hypopacha* NEUMEGEN & DYAR, Journ. N.Y. Ent. Soc., Vol. I, p. 29.

**H. grisea** *Neumegen*.

1882—*Cnethocampa grisea* NEUMEGEN, Papilio, Vol. II, p. 134.

Dark gray with waved pale t. a. and t. p. lines bordered on both sides by faint black shades. S. t. line blackish, arcuate, retracted at veins 4—6. Secondaries immaculate paler gray. Expanse, 27 mm.

*Habitat*, Arizona.

Genus **Artace** *Walker*.

1855 *Artace* WALKER, Cat. Brit. Mus., pt. VI, p. 1491.

**A. punctistriga** *Walker*.

1855 *Artace punctistriga* WALKER, Cat. Brit. Mus., Vol. VI, p. 1491.

1874 *Titya rubripalpis* FEIDER, Reise d. Novara Lep., Vol. IV, pl. 84 f. 5.

White, with black venular dots on primaries. These are arranged in six rows; the sub-basal of two dots only, the t. a., median, and t. p. distinct, with two dots at end of cell; s. t. row smoky, faint; terminal row small. Expanse, 22—30 mm.

*Habitat*, Southern States to Mississippi Valley, to New York.

Genus **Tolyte** *Hübner*.

1822?—*Tolyte* HÜBNER, Verz. bek. Schmett., p. 189

1856 *Planosa* FITCH, Rep. Ins. N. Y., Vol. II, p. 268.

*Synopsis of species.*

Thorax of ♂ white . . . . .	<b>velleda.</b>
Thorax of ♂ black or gray.	
♀ Similar to ♂, slightly paler; size midium . . . . .	<b>distincta.</b>
♀ Very dissimilar to ♂; ♂ dark, ♀ very pale; size smaller . . . . .	<b>laricis.</b>

**T. vellea** *Stoll.*1791—*Bombyx vellea* STOLL, Suppl. Cramer, pl. 41, f. 4.

Thorax white, central tuft blackish brown, abdomen pale gray banded with darker gray. Fore wings light gray, shading into blackish in median and sub-terminal spaces. Base of wings white; t. a. line narrow, white; t. p. line double, sinuate; s. t. line distinct, even, white, sinuate, forming a large curve from apex to vein 6; terminal lines and outer part of fringe on both wings white. Secondaries pale gray with whitish mesial and s. t. lines. Expanse, 30—50 mm.

*Habitat*, Atlantic States westward.**T. distincta** *French.*1890 *Tolyte distincta* FRENCH, Can. Ent., Vol. XXII, p. 45.

Of a slaty gray, the thorax gray in the ♂, partly white only in ♀. Lines as in *velleda*, but narrower, almost linear, defined by dark gray shades. The sexes are similar as in *velleda*, the ♀ slightly paler. Expanse, 35 mm.

*Habitat*, Colorado.**T. laricis** *Fitch.*1856 *Planosa laricis* FITCH, Rep. Ins. N. Y., Vol. II, p. 262.1863—*Gastropacha vellea* var. *minuta* GROTE, Proc. Ent. Soc. Phil., Vol. II, p. 433.

♀ Thorax and primaries pure white, except the brown crest, and the sub-terminal and terminal part of the normal brown markings of primaries. Secondaries and abdomen very pale gray.

♂ Black; wings dark blackish gray, with three paler bands which correspond to mesial, t. p. and s. t. lines, the two outer undulate. Expanse, 25—30 mm.

*Habitat*, Atlantic States westward.Genus **Dendrolimus** *Germer.*1824—*Dendrolimus* GERMER, Syst. Prodr., p. 48.1872—*Gloveria* PACKARD, Rep. Peab. Acad., Vol. IV, p. 89.1881 *Quadrina* GROTE, Papilio, Vol. I, p. 75; 1886—SMITH, Ent. Amer., Vol. II, p. 124.*Synopsis of species.*

Intercostal cell of secondaries short, reaching half way to end of discal cell.

Vein 6 of primaries free or on a short stalk with vein 8; vein 8 free  
or more often, on a stalk with vein 7 when 6 is free. **dolores.**

Veins 6 and 7 on a stalk, usually long, rarely none; vein 8 free.

Gray, sub-terminal line sharply and evenly angled, **arizonensis.**Brown gray, sub-terminal lines obscure, **gargamelle.**Intercostal cell reaching nearly to apex of discal cell, **diazoma.**

**D. dolores** *Neumegen & Dyar.*1893 - *Dendrolimus dolores* NEUMEGEN & DYAR, Ent. News, Vol. IV, p. 270.

♀ Similar to *D. arizonensis*, but the transverse lines are more obscure, and the sub-terminal is roundedly undulate, not dentate, the outer angles of the dentations of *arizonensis* being lost. In the interspace between veins 3 and 4 there is a larger projection of the line than elsewhere. ♂ unknown.

*Habitat*, Colorado.

**D. arizonensis** *Packard.*1872—*Gloveria arizonensis* PACKARD, Rep. Peab. Acad., Vol. IV, p. 90.1884—*Gloveria dentata* HY. EDWARDS, Papilio, Vol. IV, p. 107.

♀ Gray, overspread with whitish except in terminal space; secondaries and abdomen brownish. On primaries a white discal dot; t. a. and t. p. lines dark, straight, the t. p. line bent deeply inwards opposite cell; sub-terminal line very distinct, sharply and evenly dentate. Expanse, 95 mm. ♂ unknown.

*Habitat*, Arizona, Mexico.

**D. gargamelle** *Strecker.*1885—*Lasiocampa gargamelle* STRECKER, Proc. Acad. Nat. Sci. Phil., 1884, p. 286.1884—*Gloveria arizonensis* ♂ HY. EDWARDS, Papilio, Vol. IV, p. 107.

♀ Dark brown, the fore wings grizzled with white hairs; very uniform in tint the sub-terminal line undulate and somewhat irregular, dark, bordered inwardly by pale scales. A round white discal dot. Hind wings brown, darker than in the ♀, with no trace of any paler band. Abdomen dark brown. Expanse, 85 mm.

♂ Brown; fore wings brown with white hairs intermixed, the basal third and outer margin darker, more brownish; median space somewhat ashen. Transverse lines faint; the sub-terminal irregular as in the ♀. Secondaries brown, with a paler, somewhat ochraceous mesial band; fringe white. Expanse, 57 mm.

*Habitat*, Arizona.

[Our ♀ specimens do not exactly agree with Dr. Strecker's description.]

**D. diazoma** *Grote.\**1881—*Quadrina diazoma* GROTE, Papilio, Vol. I, p. 75.1884—*Gloveria? diazoma* HY. EDWARDS, Papilio, Vol. IV, p. 109.

♀ Wings nearly concolorous, brownish, brighter at base. A curved, even, dark, extra mesial shade line on primaries; an un-

\* Through the courtesy of Prof. J. H. Comstock, we have been able to examine a photograph of the venation of this species.

even, broken sub-terminal line. Hind wings with a reddish shade, which obtains slightly on apex of primaries. Expanse, 95 mm.

*Habitat*, New Mexico [Gröte.]

### Family COSSIDÆ.

#### *Synopsis of sub-families and genera.*

Vein 8 of secondaries united to sub-costal by a cross-vein.	
Antennæ of ♂ pectinated for the basal half; frenulum distinct,	<b>Zeuzerinæ.</b> ✓
Antennæ of ♂ pectinated to the tip; frenulum rudimentary,	<b>Cossinæ.</b> ✓
Sexes approximate in size	<b>Cossus.</b>
Sexes disproportionate and differently marked	<b>Prionoxystus.</b>
Vein 8 of secondaries free from the base	<b>Hypoptinæ.</b> ✓
Vein 11 of primaries arising from the accessory cell	<b>Cossula.</b>
Vein 11 from the discal cell	<b>Hypopta.</b>

#### Subfamily ZEUZERINÆ.

#### Genus **Zeuzera** Latreille.

1804—*Zeuzera* LATREILLE, Nouv. Dict. d'Hist. Nat., Vol. XXIV, p. 186.

1822?—*Latagia* HUEBNER, Verz. bek. Schmett., p. 196.

#### *Synopsis of species.*

Fore wings covered with round blackish spots	<b>pyrina.</b>
Fore wings with blackish strigæ	<b>canadensis.</b>

#### **C. pyrina** Linnaeus.

1761 *Noctua pyrina* LINNÆUS, Faun. Suec., p. 306.

1751—*Phalena hypocastani* PODA, Mus. Grace, p. 88.

1767—*Noctua æsculi* LINNÆUS, Syst. Nat., Vol. I (2), p. 833.

1785—*Phalena hilaris* FOUCROY, Ent. Paris, Vol. II, p. 306.

1892—*Zeuzera decipiens* KIRBY, Cat. Lep. Het., Vol. I, p. 871.

White, thorax with six round black spots, the two anterior sometimes united; abdomen black banded with two black spots at base above. Primaries thickly covered with rounded intervenular black spots. Secondaries with smaller and less distinct spots, absent at anal angle. Expanse, 45—60 mm.

*Habitat*, Europe; vicinity of New York City.

#### **Z. canadensis** Herrich-Schäffer.

1854—*Zeuzera canadensis* HERRICH-SCHLEFFER, Auser. Schmett., Vol. I, f. 168.

Thorax ochraceous, abdomen paler, more whitish; primaries white, heavily covered over the basal half below median vein and outwardly centrally almost to margin with a blackish shade; costa tinged with brown. All the wings thickly covered with partly

confluent, short, transverse black strigæ. Secondaries white with a very few strigæ at outer margin, otherwise immaculate. Expanse about 30 mm.

*Habitat*, Canada. [Herrich-Schäffer.]

Sub-family COSSINÆ.

Genus *Cossus* Fabricius.

1794—*Cossus* FABRICIUS, Ent. Syst., Vol. III (2), p. 8.

1810?—|| *Teredo* HUEBNER, Tentatmen, p. 1.

1866—*Trypanus* RAMBUR, Cat. Lep. And., Vol. II, p. 326.

*Synopsis of species.*

Size large, expanse at least 45 mm.

Dark colored; collar black . . . . . **centerensis**

Paler, collar gray or white.

Collar nearly white, primaries with very distinct transverse black lines . . . . . **undosus.**

Collar yellowish gray; clouded along costa.

Indistinctly reticulated, with prominent median line . . . **populi.**

Distinctly reticulated with black; mottled . . . . . **orc.**

Size smaller, expanse not more than 40 mm.

Pale, with distinct transverse lines . . . . . **perplexus.**

Darker, shaded, with no evident lines . . . . . **mucidus.**

**C. centerensis** *Lintner.*

1879—*Cossus centerensis* LINTNER, Can. Ent., Vol. IX, p. 129.

Fore wings heavily reticulated, some transverse lines more prominent than others; the markings black on a sordid white ground which is also powdered with black; basal half obscured. Secondaries translucent with merest trace of reticulations. Abdomen blackish, obscurely banded with pale. Expanse, 50—65 mm.

*Habitat*, Atlantic States.

**C. undosus** *Lintner.*

1878—*Cossus undosus* LINTNER, Rep. N. Y. State Mus., Vol. XXX, p. 243.

1899—*Cossus brucei* FRENCH, Can. Ent., Vol. XXII, p. 44.

Pale gray, the reticulations much as in *C. centerensis*, but the transverse lines are more strongly marked, especially a median, and sub-terminal one, and the white ground is less obscured by brown powderings. Secondaries opaque white, finely and densely reticulated. Expanse, 60—75 mm.

*Habitat*, Rocky Mountain region.

**C. populi** *Walker.*1856—*Cossus populi* WALKER, Cat. Brit. Mus., pt. VII, p. 1515.1882—*Cossus angrezi* BAILEY, Papilio, Vol. II, p. 93.

Collar and head yellowish gray, thorax partly black. Fore wings with nearly white ground shaded with blackish, with black and reticulated lines, those crossing the center of the wings most distinct. Hind wings yellowish gray, mottled with blackish outwardly. Expanse, 60—80 mm.

*Habitat*, Nevada, Hudsons Bay.

**C. orc** *Strecker.*1893—*Cossus orc* STRECKER, Proc. Acad. Nat. Sci. Phil., p. 282.

Closely similar to *C. populi* but the lines more reticulated, less strigose, giving the fore wing a mottled appearance. Otherwise the species are alike. Expanse, 55—75 mm.

*Habitat*, The Pacific northwest.

**C. perplexus** *Neumagen & Dyar.*1893—*Trypanus perplexus* NEUMÆGEN & DYAR, Journ. N. Y. Ent. Soc., Vol. I, p. 31.

Ash gray; reticulations becoming obsolete, irregular and branched; median and sub-terminal lines remain. Secondaries unicolorous, pale cinereous, sub-translucent. Expanse, 33 mm.

*Habitat*, Colorado.

**C. mucidus** *Hy. Edwards.*1882—*Cossus mucidus* HY. EDWARDS, Papilio, Vol. II, p. 126.

Reticulations converted into dense transverse strigæ, the fore wings all obscured by blackish shading except the basal costal half where ground color appears, sordid white. Secondaries sordid white, minutely strigose, appearing pulverulent. Expanse, 36—40 mm.

*Habitat*, Arizona.

Genus **Prionoxystus** *Grote.*1882—*Prionoxystus* GROTE, New Check-list, p. 63.1874—*Xystus* GROTE, Proc. Amer. Phil. Soc., Vol. XIV, p. 262.*Synopsis of species.*

Wings opaque, secondaries of ♂ partly orange . . . . .	<b>robiniaë.</b>
Secondaries of ♀ also orange tinted . . . . .	<b>var. quercus.</b>
Wings sub-hyaline, no orange . . . . .	<b>macmurtrei.</b>



**P. robiniae** Peck.

- 1818—*Cossus robiniae* PECK, Mass. Agric. Rep. Journ., Vol. V, p. 67.  
 1856—*Cossus plagiatus* WALKER, Cat. Brit. Mus., pt. VII, p. 1515.  
 1864—*Xyleutes crepera* GROTE, Proc. Ent. Soc. Phil., Vol. III, p. 388.  
 1878—*Cossus reticulatus* LINTNER, Rep. N. Y. Mus., Vol. XXX, p. 242.

*var. quercus* Ehrmann.

- 1893—*Prionoxystus robiniae* var. *quercus* EHRMANN, Can. Ent., Vol. XXV, p. 257.

♂ Dull cinereous, patagia and collar bordered with black. Primaries densely reticulated with black, forming a broad diffuse band of black from internal margin to apex, running also on to discal cell. Secondaries golden yellow, black on basal half, costal and internal margins and narrow outer edge. Expanse, 50—55 mm.

♀ Paler, almost white; reticulations less dense so that the black band is broken up into several isolated and variable patches. Secondaries blackish, the reticulations of under side appearing by transparency. Expanse, 55—70 mm.

*Habitat*, Atlantic States westward.

**P. macmurtrei** Guérin.

- 1829—*Cossus macmurtrei* GUÉRIN, Icon. R. Anim. Ins., pl. 85, f. 2.  
 1858—*Cossus querciperda* FITCH, Rep. Ins. N. Y., Vol. V, p. 10.

♂ Very small, wings hyaline with traces of the black transverse reticulations; secondaries hyaline with narrow black border, broader on internal margin.

♀ With very large abdomen; wings whitish hyaline, the reticulations mostly transverse, recalling *C. undosus*. Secondaries sub-hyaline, immaculate above. Expanse, 60 mm.

*Habitat*, Atlantic States.

## Sub-family HYPOPTINÆ.

Genus **Cossula** Bailey.

- 1882—*Cossula* BAILEY, Papilio, Vol. II, p. 93.  
 1888—*Inguromorpha* HY. EDWARDS, Ent. Amer., Vol. III, p. 182.

**C. basalis** Walker.

- 1856—*Cossus basalis* WALKER, Cat. Brit. Mus., pt. VII, p. 1523.  
 1876—*Cymatophora magnifica* STRECKER, Proc. Acad. Nat. Sci. Phil., p. 151.  
 1882—*Cossus magnifica* BAILEY, Papilio, Vol. II, p. 93.  
 1888—*Inguromorpha slossonii* HY. EDWARDS, Ent. Amer., Vol. III, p. 183.

♂ Pale gray. At base of primaries, a deep black transverse band; at internal angle and apex are distinct lines forming circles,

the enclosed spaces dotted with brownish scales; several other irregular black marks. Expanse, 32 mm.

♀ Pale ash color, secondaries darker. Primaries with diffuse dark brown strigæ. Outer border (one-fifth of wing) dull ochereous, defined inwardly and on the fringe by dark brown, and also in a spot at middle of outer margin. Expanse, 36 mm.

*Habitat*, Florida.

### Genus *Hypopta* Hübner.

1822—*Hypopta* HUEBNER, Verz. bek. Schmett., p. 195.

#### *Synopsis of species.*

- Wings nearly uniformly white; pectinations of antennæ brown . . . **manfredi.**  
 Wings more or less mottled or irrorate with dark shades; pectinations of antennæ blackish.
- With blackish marks at end of median vein.  
 Terminal half of wing thickly covered with intervenular purplish confluent spots . . . . . **theodori.**  
 Dark marking extending only from origin of vein 2 to cross vein or further; fringe of secondaries almost entirely white . . . . . **bertholdi.**  
 Dark marks confined to origin of veins 3—4; fringe of secondaries distinctly black spotted . . . . . **ethela.**
- Without any blackish discal marks.  
 Wings largely marbled with pale brown, the white ground reduced to a series of confluent spots . . . . . **henrici.**  
 A brown spot on middle of interior margin only . . . . . **cornelia.**  
 Without any brown markings on fore wings, white, irrorate with black scales . . . . . **edwardi.**  
 Wings gray, reticulated with black lines . . . . . **nanus.**

#### **H. manfredi** Neumøgen.

1884—*Hypopta manfredi* NEUMØGEN, Papilio, Vol. III, Vol. 139.

White, obscurely irrorate with brown scales on primaries, becoming defined on the cell into a rather distinct shade. Antennæ brown. Expanse, 30 mm.

*Habitat*, Arizona.

#### **H. theodori** Dyar.

1893—*Hypopta theodori* DYAR, Can. Ent., Vol. XXV, p. 220.

White, terminal half of both wings nearly covered by confluent intervenular purplish spots, which become smaller towards margin and on primaries form a continuous blackish shade beyond cell from origin of vein 2 to sub-costal vein. Expanse, 30 mm.

*Habitat*, New Mexico.

**H. bertholdi** Grote.

1880—*Hypopta bertholdi* GROTE, Bull. Brook. Ent. Soc. Vol. III, p. 45.

Pale gray, veins of primaries black. Costa and central area of primaries white, cut by the black veins, the white spreading diffusely into the gray; at veins 2—5 at base, the black spreads between the veins. Expanse, 35 mm.

*Habitat*, Colorado.

**H. ethela** Neumøgen & Dyar.

1893—*Hypopta ethela* NEUMEGEN & DYAR, Journ. N. Y. Ent. Soc. Vol. I, p. 32.

Gray; primaries blackish, the white ground heavily irrorate with black scales. A small spot at end of cell without irrorations, and just below it an elongated black spot. Secondaries nearly black centrally. Expanse, 28 mm.

*Habitat*, Colorado.

**H. henrici** Grote.

1882—*Hypopta henrici* GROTE, Papilio, Vol. II, p. 131.

White, with a grayish cast, ♀ darker. Pale yellowish gray rounded confluent spots in a sub-terminal band and one through cell and sub-median interspace, break up the ground into a series of more or less confluent spots, but leave the costa white. Secondaries of ♀ gray, abdomen white. Expanse, 35 mm.

*Habitat*, Arizona.

**H. cornelia** Neumøgen & Dyar.

1893 *Hypopta cornelia* NEUMEGEN & DYAR, Journ. N. Y. Ent. Soc., Vol. I, p. 32.

White; a faint brownish tinge on primaries, which becomes marked beyond the cell, forming two obscure, parallel transverse lines; along internal margin a patch of brownish black and pale ochereous scales, broken up obscurely by the ground color. Secondaries light gray. Expanse, 27 mm.

*Habitat*, Colorado.

**H. edwardi** Neumøgen & Dyar.

1893—*Hypopta edwardi* NEUMEGEN & DYAR, Journ. N. Y. Ent. Soc., Vol. I, p. 32.

Gray; primaries white, irrorate with black scales, less thickly over the cell. A faint brownish discoloration in the interspaces at base of veins 2—5 at end of cell. Secondaries brownish gray. Expanse, 40 mm.

*Habitat*, Colorado.

**H. nanus** *Strecker*.\*

1876—*Cossus nanus* STRECKER, Proc. Acad. Nat. Sci. Phil., p. 151.

“Expands  $1\frac{1}{8}$  inch. Has the appearance of a miniature *Cossus ligniperda*, is gray, of lighter and darker shades and reticulated with black lines which are most noticeable across the disk and on the terminal part of wing. Secondaries uniform grayish. Beneath grayish, faintly reticulated,

*Habitat*, Colorado.”

Family HEPIALIDÆ.

*Synopsis of genera.*

Size large; apices of primaries rectangular, sub-falcate . . . . . **Sthenopis.**  
 Size smaller; apices rounded . . . . . **Hepialus.**

Genus **Sthenopis** *Packard*.

1864—*Sthenopis* PACKARD, Proc. Ent. Soc. Phil., Vol. III, p. 390.

*Synopsis of species.*

General color silvery smoky gray.  
 Two silvery spots near base of discal cell.  
     Color smoky gray . . . . . **argenteomaculatus.**  
     Ground color silvery purple . . . . . *var.* **purpurascens.**  
 One silvery spot near base and another sub-apical . . . . . *var.* **los.**  
 No silver dots on primaries . . . . . *var.* **perdita.**  
 General color pale salmon . . . . . **quadriguttatus.**  
 General color white . . . . . **thule.**  
 General color dull lilac, gold tinted . . . . . **auratus.**

**S. argenteomaculatus** *Harris*.

1841—*Hepialus argenteomaculatus* HARRIS, Rep. Ins. Mass., p. 295.

1864—*Sthenopis argentatus* PACKARD, Proc. Ent. Soc. Phil., Vol. III, p. 292.

1885—*Cossus alni* KELLICOTT, Ent. Amer., Vol. I, p. 175.

*var.* **purpuracens** *Packard*.

1863—*Gorgopis purpurascens* PACKARD, Bost. Journ. Nat. Hist., Vol. VII, p. 598.

*var.* **los** *Strecker*.

1893—*Hepialus los* STRECKER, Proc. Acad. Nat. Sci. Phil., p. 282.

*var.* **perdita** *Dyar*.

1893—*Sthenopis argenteomaculatus var. perdita* DYAR, Can. Ent., Vol. XXV, p. 327.

Sable brown with a silvery tint, with several large dark brown marks bordered by a bright shade; outer margin dark, broadly so at internal angle, with or without two silvery spots near the base

\* We are indebted to Dr. Strecker for a sketch of the venation of this species.

of the wing. Secondaries uniformly sub-translucent, brown, with an apical slightly silvery mark. Expanse, 65—105 mm.

*Habitat*, Northern Atlantic States northward.

**S. quadriguttatus** Grote.

1864—*Gorgopis quadriguttatus* GROTE, Proc. Ent. Soc. Phil., Vol. III, p. 73.

1893—*Sthenopis argenteomaculatus* var. *semiauratus* NEUMEGEN & DYAR, Can. Ent., Vol. XXV, p. 124; 1893—GROTE, Can. Ent., Vol. XXV, p. 186; 1893—STRECKER, Proc. Acad. Nat. Sci. Phil., p. 283.

Of a pale salmon color with olivaceous golden brown bands arranged as in *argenteomaculatus*, consisting of oblique basal, abbreviated discal and sub-apical; two costal spots and terminal band, the latter wide at internal angle and inclosing a paler shade. Near base of cell on primaries two silvery spots, ringed with black.

*Habitat*, Mountains of New England northward.

**S. thule** Strecker.

1875—*Hepialus thule* STRECKER, Lep. Roph. & Het., pt. 105, pl. 12, f. 6.

Yellowish white, the costal third of wing as far as end of cell, densely mottled with cinnamon brown. A few irregular small brown spots scattered over the wing. Near base of cell two white spots, and at upper angle of cell two others, all black ringed. Secondaries white, with a few brown marks on the costal edge. Expanse, 65 mm.

*Habitat*, Canada, Wisconsin.

**S. auratus** Grote.

1878—*Hepialus auratus* GROTE, Can. Ent., Vol. X, p. 18.

Yellowish brown with a brassy lustre and whitish ill defined marks appearing most strongly on two parallel bands (t. p. and s. t.), the latter marked with two or three silvery white triangular spots sub-apically. Expanse, 48 mm.

*Habitat*, New York, New Hampshire.

Genus *Hepialus* Fabricius.

1775—*Hepialus* FABRICIUS, Syst. Ent., p. 589.

1852—*Epialus* LEDERER, Verh. Zool. Bot. Ges. Wien, Vol. II, p. 73.

*Synopsis of species.*

An oblique band from near internal angle to base of wing.

Silvery white or whitish markings on wing.

Wing opaque, markings silvery . . . . . **ganna.**

Wings sub-translucent, markings faintly silvery or white.

Size 30 mm. or less . . . . .	<b>mustelinus.</b>
Size more than 30 mm. . . . .	<b>gracilis.</b>
No white marks, bands smoky . . . . .	<b>roseicaput.</b>
No such oblique band.	
Transverse rows of whitish spots, dusky bordered . . . . .	<b>lembertii.</b>
Transverse bands partly silvery white.	
Silver spots well fused, especially in outer band . . . . .	<b>sequoiolus.</b>
Silver spots smaller, nearly separate or reduced . . . . .	<b>behrensi.</b>
No silvery marks on wings.	
Size rather large (35—55 mm.) . . . . .	<b>montanus.</b>
Size small (less than 30 mm.) . . . . .	
No red marks; color ochereous or partly stone color . . . . .	<b>hectoïdes.</b>
With traces of transverse bands marked with bright red . . . . .	<i>var.</i> <b>lenzi.</b>

### **H. ganna** *Hübner.*

1804?—*Bombyx ganna* HUEBNER, Eur. Schmett. Bomb., f. 215.

1884—*Hepialus confusus* HY. EDWARDS, Papilio, Vol. IV, p. 122.

1886—*Hepialus mc-glashani* HV. EDWARDS, Ent. Amer., Vol. II, p. 14.

#### *var.* **hyperboreus** *Müschler.*

1862—*Epialus hyperboreus* MOESCHLER, Wien. Ent. Mon., Vol. VI, p. 129.

1864—*Hepialus pulcher* GROTE, Proc. Ent. Soc. Phil., Vol. III, p. 522.

#### *var.* **matthewi** *Hy. Edwards.*

1874—*Hepialus matthewi* HY. EDWARDS, Proc. Cal. Acad., Vol. V, p. 265.

Ground color yellowish brown, dark brown (*hyperboreus*) or pale yellowish brown with orange tints (*matthewi*), with irregular silvery bands on primaries. These consist of a band which starts at base, runs to costal third, then to internal margin before internal angle and thence to apex; it is angular and furnished with irregular projections, sometimes broken into spots or partly absent. A discal spot, one on basal third of internal margin and some marks on middle of outer margin, all of which may be more or less reduced or absent. Secondaries blackish, paler along costa and outer margin. Expanse, 25 - 35 mm.

*Habitat*, Arctic and mountainous regions of Europe and North America.

### **H. mustelinus** *Packard.*

1864—*Hepialus mustelinus* PACKARD, Proc. Ent. Soc. Phil., Vol. III, p. 393.

1864—*Hepialus labradoriensis* PACKARD, Proc. Ent. Soc. Phil., Vol. III, p. 394.

Brown; primaries faintly mottled with paler brown with a whitish somewhat irregularly outlined band along internal margin and reaching from before internal angle to apex; above it, along the margin, a black shade. Expanse, 27 mm.

*Habitat*, Labrador.

**H. gracilis** Grote.

1864—*Hepialus gracilis* GROTE, Proc. Ent. Soc. Phil., Vol. III, p. 522.

1884—*Hepialus furcatus* GROTE, Can. Ent., Vol. XV, p. 30.

Sub-translucent obscure gray. A pale white band from apex to internal margin, running thence to base, rather broad but indented. The rest of the wing obscurely clouded with black and brownish scales, without distinct marks. Outer margin white, fringe black spotted. Expanse, 33—40 mm.

Larger than *mustelinus* and paler in the specimens before us, but with the same markings; probably not specifically distinct.

*Habitat*, Northern Atlantic States to Canada.

**H. roseicaput** Neumogen & Dyar.

1893—*Hepialus roseicaput* NEUMGREN & DYAR, Can. Ent., Vol. XXV, p. 125.

Primaries salmon brown, with obscure smoky black bands arranged after the pattern of *gamma*. Secondaries blackish. Expanse, 33 mm.

*Habitat*, British Columbia.

**H. lembertii** Dyar.

1894—*Hepialus lembertii* DYAR, Ent. News, Vol. V, p. 25.

Ocherous with the bands broken up into a series of dusky bordered, sub-hyaline, whitish spots, varying considerably in size and distinctness. Certain of them may be absent or confluent with others. Secondaries blackish. Expanse, 30—35 mm.

*Habitat*, High Sierras of California.

**H. sequoiolus** Behrens.

1876—*Hepialus sequoiolus* BEHRENS, Can. Ent., Vol. VIII, p. 174.

1876—*Hepialus mendocinolus* BEHRENS, Can. Ent., Vol. VIII, p. 174.

Dark brown with a salmon tint along costa. Two oblique silvery bands composed of spots from internal margin to sub-costal vein, bordered outwardly by a narrow red line. A sub-terminal pale band. Secondaries blackish. Expanse, 32—40 mm.

*Habitat*, California and Pacific Northwest.

**H. behrensii** Stretch.

1872—*Sthenopis behrensii* STRETCH, Zyg. & Bomb. N. A., p. 105.

1874—*Epidius tacome* HY. EDWARDS, Proc. Cal. Acad. Sci., Vol. V, p. 365.

Salmon brown, wings nearly immaculate. Three paler transverse parallel bands can be made out, the t. a. and t. p. marked

with silver on lower third. Outer band (3rd) often absent. Expanse, 55 mm. Probably not different from the preceding.

*Habitat*, California and Pacific Northwest.

**H. montanus** *Stretch*.

1872—*Hepialus montanus* STRETCH, Zyg. & Bomb. N. A., p. 105.

1875—*Hepialus desolatus* STRECKER, Lep. Roph. & Het., p. 107.

1876—*Hepialus baroni* BEHRENS, Can. Ent., Vol. VIII, p. 175.

1881—*Hepialus anceps* HY. EDWARDS, Papilio, Vol. I, p. 36.

1881—*Hepialus rectus* HY. EDWARDS, Papilio, Vol. I, p. 36.

Dark brown or yellowish brown. Three maculate paler bands (t. a., t. p. and s. t.) defined by darker edges. A terminal series of similar spots. Markings obscure but evident. Secondaries concolorous or darker. Expanse, 55 mm. or less.

*Habitat*, California and the Pacific Northwest.

**H. hectoides** *Boisduval*.

1868—*Hepialus hectoides* BOISDUVAL, Ann. Soc. Ent. Fr., Vol. XII, p. 85.

1875—*Hepialus modestus* HY. EDWARDS, Proc. Cal. Acad. Sci., Vol. V, p. 112.

1881—*Hepialus inutilis* HY. EDWARDS, Papilio, Vol. I, p. 36.

*var. lenzi* *Behrens*.

1876—*Hepialus lenzi* BEHRENS, Can. Ent., Vol. VIII, p. 175.

1878—*Hepialus sangaris* STRECKER, Lep. Roph. & Het., Vol. I, p. 136.

Stone color with two oblique parallel pale yellowish bands narrowly marked with vermillion. This color may be lacking, or the bands, or all the stone colored shade, leaving the wings pale yellowish. Expanse, 16—20 mm.

*Habitat*, California, Arizona.

---

We have not been able to recognize the following:

**Hepialus californicus** *Boisduval*.

1868—*Hepialus californicus* BOISDUVAL, Ann. Ent. Soc. Belg., Vol. XII, p. 85.

It has the appearance and form of *carnus* of the Alps. Fore wings obscure gray, showing in a certain light towards the extremity some whitish parallel rays enclosing little rounded patches of a more obscure color. Hind wings blackish gray.



ADDITIONS AND CORRECTIONS.

Family **Euchromiidae**. For *Lycomorpha fulgens* Hy. Edw. read *L. equalis* Walk. and remove the name from the list of North American species. Add *L. fulgens* as a synonym of *L. grotei*.

Family **Lithosiidae**, genus *Pagara*. Add *P. endora* Dyar, 1894, Ent. News, Vol. V, p. 198. Like *P. simplex* but white instead of gray. *Habitat*, Southern States.

Genus *Clemensia*. Add *C. lactea* Stretch, 1885 *Cisthene lactea* Stretch, Ent. Amer., Vol. I, p. 103. White with about six small black spots. *Habitat*, California.

Omit the sub-family Eudulinae (= Geometrids).

Family **Arctiidae**. Add to *Scirarctia echo* as a synonym *Spilosoma niobe* Strecker, Proc. Acad. Nat. Sci., 1884, p. 284. Add to *Estigmene acrea* as a synonym *Leucarctia acrea* var. *klagesii* Ehrmann, Can. Ent., Vol. XXVI, p. 292 (1894).

Genus *Paruchetes*. For *P. cadaverosa* Grt. read *P. insulata* Walker, 1855, Cat. Brit. Mus., pt. III, p. 734.—Beutenmüller, 1894, Bull. Am. Mus. N. H., Vol. VI, p. 368, and place *cadaverosa* as a synonym.

Page 153 erase the genus *Coscinia* (not American).

For genus *Haploa* read:

Vein 5 of secondaries arising close to 4 . . . . . **Haploa.**

Vein 5 of secondaries from near middle of cell . . . . . **Doa.**

**Doa** gen. n.

Differs from *Coscinia* in the broader trigonate wings, the presence of vein 5 on secondaries and the greater coalescence of 8 with sub-costal, nearly reaching tip of cell. On fore wings veins 7-8 and 9-10 arise from a pair of separate stalks from the cell, while in *Coscinia* the stalks are fused into one at basal half, so that 7-10 are on a single stalk. Ocelli present, front smooth, head prominent, tongue moderate. Type *Doa dora* Neum. & Dyar.

*Synopsis of species.*

Fore wings gray, without borders . . . . . **dora.**

Fore wings white, edged with a narrow black line on costa and outer margin **ampla.**

**D. dora** sp. n.

♀ Fore wings carneau gray crossed before the middle and again beyond the cell by a broad, diffuse, dark gray band; terminally the wing is scarcely darker than elsewhere. Six black dots arranged exactly as in *D. ampla* Grt. Costal edge and fringe concolorous. Secondaries, underside and abdomen dark blackish gray, uniform, immaculate, except for a small discal dot on both wings below. Thorax apparently concolorous with fore wings, but injured. Antennae black. Expanse, 38 mm.

*Habitat*, Guadalajara, Mexico.

Page 155 for *Cosciniã ampla* Grote, read *Doa ampla* Grote.

Genus *Kodiosoma*. Reduce all the four species to one, being varieties of *K. fulva*.

Family **Agaristidæ**—The only character to separate this family from the Noctuidæ is the swollen antennæ. Therefore we would suggest that all the genera here enumerated, except *Alypia*, be transferred to the Noctuidæ.

Place Genus *Seudyra* Stretch as a synonym of *Zalissa* Walker, 1865 Cat. Brit. Mus., pt XXXIII, p. 936; 1894 Hampson, Moths of India, Vol. II, p. 155.

Genus *Alypiodes* (not *Alypioides*) add *A. bimaculata* H.-S. Like *A. crescens* but without a yellow spot on secondaries above. *Habitat*, New Mexico.

Family **Lagoidæ**—Add to genus *Carama* the following:—*C. pura* Butler (1878, Trans. Ent. Soc. Lond., p. 64). Like *C. cretata* but the whole head is pale lemon yellow except the front which is blackish. *Habitat*, Southern States, (♂ Washington, D. C.)

Family **Pyromorphidæ**—Substitute the following synopsis of genera for the one given on page 63:

Veins 8—9 stalked, or all veins free (from cell) when 8 is absent.

Primaries elongate, narrow, apex acute; vein 8 absent . . . **Acoloitus.**

Primaries broader, apex rounded; vein 8 usually present.

Costa of primaries convex . . . . . **Pyromorpha.**

Costa straight . . . . . **Tripocris.**

Veins 8—10 stalked, or 9—10 stalked when 8 is absent . . . **Harrisina.**

Genus *Tripocris*. Add *T. lustrans* Beutenmüller. 1894, Bull. Am. Mus. Nat. Hist., Vol. VI, p. 367. Black, with metallic blue lustre; expanse, 31 mm. *Habitat*, Colorado.

Family **Limacodidæ**—Erase *Limacodes viridus* Reak. as a synonym of *Euclca indetermina* Bd. and place it as a synonym of *Parasa chloris* H.-S.

Family **Notodontidæ**—Insert *Heterocampa chapmani* Grote. It is unknown to us, but presumably a good species.

Family **Saturniidæ**—Change the synopsis of sub-families to read:

Antennæ doubly bipectinated in the ♀ . . . . . **Attaciinæ.**

Antennæ simply bipectinated or simple in the ♀ . . . **Hemileucinæ.**

Erase "sub-family Lemoniinæ" on p. 129 and insert sub-family Hemileucinæ before genus *Automeris* on page 127.

## LIST OF UNRECOGNIZED NAMES.

*Lycomorpha desertus* HV. EDW., Papilio, Vol. I, p. 81 (1881).  
Type lost; family and generic location uncertain.

*Edema plagiata* WALKER, Cat. Brit. Mus., pt. XXXII, p. 427  
(1865). Type lost, description unrecognizable.

*Rhagois bicolor* WALKER, Trans. Ent. Soc. Lond., (3), Vol. I,  
p. 270 (1862). Type lost, description unrecognizable.

## APPENDIX.

We have refrained from changing any of the family names during the publication of the foregoing revision; but certain changes seem desirable. It would appear proper to alter the name of a family when the genus from which it was taken becomes a synonym.\* On this account, principally, the following changes are suggested:—

(1) *Euchromiidae*. We took this name from Kirby's Catalogue (*Euchromiinae*, p. 117); but as *Syntomidae* has been used previously and is adopted by Hampson, it would seem preferable to use it. However, according to Kirby, *Syntomis* is a synonym of *Zygana*, and hence the family should be called *Zyganidae*. We have felt unwilling to make this change, as the name has been commonly associated with such different insects (*Anthroceridae*, type *A. filipendula* L.).

(2) *Liparidae*. Kirby and Hampson agree in suppressing the genus *Liparis*. The name will be changed to *Lymantriidae*, following Hampson (*Moths of India*, Vol. I, p. 432).

(3) *Drepanulidae*. Mr. Grote has suggested to us that this should be *Platypterygidae*. However, as the name stands, it is uniform with Kirby and Hampson. We would make it *Drepanidae*.

(4) *Limacodidae*. Both the genera *Limacodes* and *Cochlidion* have become synonyms. In correspondence with Prof. Comstock we have concluded to call the family *Eucleidae*.

(5) *Lagoide*. This should be changed to *Megalopygidae* not only because *Lagoa* has become a synonym, but also in recognition of the work of Carlos Berg (*Ann. Soc. Cient. Argentina*, Vols. XIII—XIV).

\* See rules of nomenclature adopted by the international zoological congress held in Moscow, 1892.

(6) *Saturniidae*. It may be advantageous to recognize the two sub-families as of family rank, i. e. *Saturniidae* (*Attacinae*) and *Hemileucidae*.

(7) *Ceratocampidae* should be changed to *Citheroniidae* as *Ceratocampa* is a synonym.

Finally we would arrange the families here treated of in systematic order, following the classification into sub-orders founded by Prof. Comstock and the super-families of the *Frenatae* suggested by Mr. Dyar.

Type **Arthropoda**, Class **Hexapoda-Insecta**, Order **Lepidoptera**.

Sub-order **Jugatae**.

Family *Hepialidae*.

Sub-order **Frenatae**.

Super-family **Cossina** (*Microlepidoptera*).

Families *Cossidae*.

*Psychidae*.

*Lacosomidae*.

Super-family **Anthrocerina**.

Families *Pyromorphidae*.

*Megalopygidae*.

*Eucleidae*.

Super-family **Saturnina** (*Bombycina*).

Families *Citheroniidae*.

*Hemileucidae*.

*Saturniidae*.

*Bombycidae*.

Super-family **Noctuina**.

Families *Notodontidae*.

*Lithosiidae*.

*Dioptidae*.

*Arctiidae*.

*Drepanidae*.

*Euchromiidae* (*Zygænidæ*).

*Agaristidae*.

*Lymantriidae*.

*Pericopidae*.

Super-family **Lasiocampina** (?).

Family *Lasiocampidae*.